Serial No. 10/006,543 Filed November 30, 2001

Exhibit D 'tzlbac14.log'

```
SOL> @tzlbac14
SOL>
SQL> CONNECT SCOTT/TIGER
Connected.
SQL>
SOL>
       CREATE TABLE abc
       (COL1 VARCHAR2 (45));
Table created.
SQL>
SOL>
      CREATE TABLE jing
  2
       (COL1 VARCHAR2 (45));
Table created.
SOL>
SQL>
       GRANT ALL ON abc TO LBACSYS;
Grant succeeded.
SOL>
SQL> -- This should not be allowed as the user is SCOTT
     EXECUTE LBAC SYSDBA.CREATE POLICY('simple', 'lbac$test1', 'raghu');
BEGIN LBAC SYSDBA.CREATE POLICY('simple', 'lbacstest1', 'raqhu'); END;
ERROR at line 1:
ORA-06550: line 1, column 7:
PLS-00201: identifier 'LBACSYS.LBAC_SYSDBA' must be declared
ORA-06550: line 1, column 7:
PL/SOL: Statement ignored
SOL>
SOL> CONNECT LBACSYS/LBACSYS
Connected.
[START: CLAIMS 1 and 21
Shows a plurality of label-based policies that are created in the database; 3rd
parameter is the policy column name]
SOL>
SQL> -- Create policies in database
SQL>
SQL>
       EXECUTE LBAC SYSDBA.CREATE POLICY('simple', 'lbac$test1', 'raghu');
PL/SQL procedure successfully completed.
       EXECUTE LBAC SYSDBA.CREATE POLICY('complex', 'lbac$test1', 'rghu');
SOL>
PL/SQL procedure successfully completed.
SQL>
       EXECUTE LBAC SYSDBA.CREATE POLICY('sile', 'lbac$testl');
PL/SQL procedure successfully completed.
[END: CLAIMS 1 and 21]
```

```
SOL>
SQL> -- Error Conditions
SQL> EXECUTE LBAC SYSDBA.CREATE POLICY('complex','lbac$test1','aqhu');
BEGIN LBAC SYSDBA.CREATE POLICY('complex', 'lbacstest1', 'aghu'); END;
ERROR at line 1:
ORA-12447: policy role already exists for policy complex
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC_SYSDBA", line .*
ORA-01921: role name 'COMPLEX DBA' conflicts with another user or role name
ORA-06512: at line 1
     EXECUTE LBAC SYSDBA.CREATE POLICY('dummy', 'lbac$test1');
BEGIN LBAC SYSDBA.CREATE POLICY('dummy', 'lbac$test1'); END;
ERROR at line 1:
ORA-12442: policy column "TESTLABEL" already used by an existing policy
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line .*
     EXECUTE LBAC SYSDBA.CREATE POLICY('new', 'lbac$test1', 'raghu');
BEGIN LBAC SYSDBA.CREATE POLICY('new', 'lbac$test1', 'raghu'); END;
ERROR at line 1:
ORA-12442: policy column "RAGHU" already used by an existing policy
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line .*
       EXECUTE LBAC SYSDBA.CREATE POLICY('new123','lbac$tt1','xyz');
BEGIN LBAC SYSDBA.CREATE POLICY('new123', 'lbac$tt1', 'xyz'); END;
ERROR at line 1:
ORA-12412: policy package lbac$tt1 is not installed
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line .*
SOL>
SOL> -- This should not fail ...
SOL>
      EXECUTE
LBAC SYSDBA.CREATE POLICY('abcdefghi|klmnopgrstuvwxyz1234','lbac$test1','fdf');
PL/SQL procedure successfully completed.
SQL>
SOL>
       EXECUTE
LBAC_SYSDBA.CREATE_POLICY('abcdefghijklmnopqrstuvwxyz','lbac$test1','fdf');
LBAC SYSDBA.CREATE_POLICY('abcdefghijklmnopqrstuvwxyz','lbac$test1','fdf'); END;
```

```
ERROR at line 1.
ORA-12447: policy role already exists for policy abcdefghijklmnopgrstuvwxyz
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-01921: role name 'ABCDEFGHIJKLMNOPORSTUVWXYZ DBA' conflicts with another
user or role name
ORA-06512: at line 1
       EXECUTE LBAC SYSDBA.CREATE_POLICY('india','lbac$test1','fdfefg');
SOL>
PL/SQL procedure successfully completed.
SOL>
SQL> -- Add 5 policies due to max label policies default increase from 5 to 10.
     EXECUTE LBAC SYSDBA.CREATE POLICY('ab1', 'lbac$test1', 'vc1');
PL/SQL procedure successfully completed.
SQL>
     EXECUTE LBAC SYSDBA.CREATE POLICY('ab2','lbac$test1','vc2');
PL/SQL procedure successfully completed.
     EXECUTE LBAC SYSDBA.CREATE POLICY('ab3','lbac$test1','vc3');
PL/SQL procedure successfully completed.
       EXECUTE LBAC SYSDBA.CREATE POLICY('ab4','lbac$test1','vc4');
SOL>
PL/SQL procedure successfully completed.
SQL> EXECUTE LBAC SYSDBA.CREATE POLICY('ab5','lbac$test1','vc5');
PL/SQL procedure successfully completed.
SOL>
SQL> -- Error Conditions
     EXECUTE LBAC SYSDBA.CREATE POLICY('abc','lbac$test1','vcx');
BEGIN LBAC SYSDBA CREATE POLICY ('abc', 'lbacstest1', 'vcx'); END;
ERROR at line 1:
ORA-12422: max policies exceeded
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line 1
     EXECUTE LBAC SYSDBA.CREATE POLICY('simple');
BEGIN LBAC SYSDBA. CREATE POLICY('simple'); END;
ERROR at line 1:
ORA-06550: line 1, column 7:
PLS-00306: wrong number or types of arguments in call to 'CREATE POLICY'
ORA-06550: line 1, column 7:
PL/SQL: Statement ignored
```

```
SOL>
     EXECUTE
LBAC SYSDBA.CREATE POLICY('abcdefghijklmnopqrstuvwxyz12345','lbac$test1','ragu')
LBAC SYSDBA.CREATE POLICY('abcdefghijklmnopgrstuvwxyz12345','lbac$test1','raqu')
; END;
ERROR at line 1:
ORA-12447: policy role already exists for policy
abcdefghijklmnopgrstuvwxyz12345
ORA-06512: at "LBACSYS.LBAC_STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC_SYSDBA", line .*
ORA-01921: role name 'ABCDEFGHIJKLMNOPQRSTUVWXYZ DBA' conflicts with another
user or role name
ORA-06512: at line 1
SOL>
SOL> -- Drop extra 5 policies from above.
SOL>
      EXECUTE LBAC_SYSDBA.DROP_POLICY('ab1');
PL/SOL procedure successfully completed.
SQL>
     EXECUTE LBAC SYSDBA.DROP POLICY('ab2');
PL/SQL procedure successfully completed.
SQL>
      EXECUTE LBAC SYSDBA.DROP POLICY ('ab3');
PL/SQL procedure successfully completed.
     EXECUTE LBAC SYSDBA.DROP POLICY('ab4');
SOL>
PL/SQL procedure successfully completed.
SQL>
     EXECUTE LBAC SYSDBA.DROP POLICY('ab5');
PL/SOL procedure successfully completed.
[START: CLAIMS 1 and 21 - list of policies created]
SQL> -- Let us check the policies created ...
SOL>
     SELECT *
      FROM DBA LBAC POLICIES
  2
  3
      ORDER BY POLICY NAME;
POLICY NAME
                            COLUMN NAME
_____
                             BIN SIZE STATUS
------
DEFAULT_FORMAT
                            POLICY FORMAT
----<del>-</del>
POLICY OPTIONS
```

DATABASE LABELS ABCDEFGHIJKLMNOPORSTUVWXYZ1234 FDF LBAC\$TEST1 1 ENABLED COMPLEX RGHU LBAC\$TEST1 1 ENABLED INDIA FDFEFG POLICY NAME COLUMN_NAME BIN SIZE STATUS ------DEFAULT FORMAT POLICY FORMAT _____ POLICY OPTIONS -----DATABASE LABELS LBAC\$TEST1 1 ENABLED SILE TESTLABEL LBAC\$TEST1 1 ENABLED SIMPLE RAGHU LBACSTEST1 1 ENABLED POLICY NAME COLUMN_NAME _____ BIN_SIZE STATUS PACKAGE -----POLICY FORMAT _____ POLICY OPTIONS ----DATABASE LABELS 5 rows selected. [END: CLAIMS 1 and 21] SOL>

SQL> EXECUTE LBAC_SYSDBA.ENABLE_POLICY('simple');

[STEP 101: "Simple" policy is enabled; STEPS 101-104 illustrate how it is determined "whether to perform [an] operation on a row of a table based on a set of labels associated with the row, the set of labels corresponding to the policy set", as recited by Claims 1 and 21.]

```
PL/SOL procedure successfully completed.
SOL>
SOL> -- The basic objective from now on is to test the enable/disable procedures
SOL>
      EXECUTE LBAC LABEL ADMIN.CREATE_LABEL('simple',1,'A,B', TRUE);
SOL>
[STEP 102: Label "A,B" is associated with policy "simple".]
PL/SQL procedure successfully completed.
       EXECUTE LBAC LABEL ADMIN.CREATE LABEL('abcdefghijklmnopqrstuvwxyz',2,'A',
SQL>
TRUE):
BEGIN LBAC LABEL ADMIN.CREATE LABEL('abcdefghijklmnopgrstuvwxyz',2,'A', TRUE);
END;
ERROR at line 1:
ORA-12416: policy abcdefghijklmnopgrstuvwxyz not found
ORA-06512: at "LBACSYS.LBAC CACHE", line .*
ORA-06512: at "LBACSYS.LBAC_LABEL_ADMIN", line .*
ORA-06512: at line 1
SOL>
SOL>
       EXECUTE
LBAC USER ADMIN.SET_USER_LABELS('abcdefghijklmnopqrstuvwxyz','SCOTT',TO_LABEL_LI
ST.FROM CHAR('abcdefghijklmnopqrstuvwxyz', NULL, 'A'));
LBAC USER ADMIN.SET USER LABELS('abcdefghijklmnopqrstuvwxyz','SCOTT',TO_LABEL_LI
ST.FROM CHAR('abcdefghijklmnopqrstuvwxyz',NULL,'A')); END;
ERROR at line 1:
ORA-01405: fetched column value is NULL
SOL>
SQL>
       SELECT *
       FROM DBA LBAC_USER_LABELS ORDER BY USER NAME, POLICY NAME;
  2
no rows selected
SOL>
SOLs -- Error Conditions
SOL>
     EXECUTE
LBAC_POLICY_ADMIN.APPLY_TABLE_POLICY('abcdefghijklmnopqrstuvwxyz','SCOTT','abc')
REGIN
LBAC POLICY ADMIN.APPLY TABLE POLICY('abcdefghijklmnopqrstuvwxyz','SCOTT','abc')
: END:
ERROR at line 1:
ORA-12416: policy abcdefghijklmnopqrstuvwxyz not found
 ORA-06512: at "LBACSYS.LBAC_CACHE", line .*
 ORA-06512: at "LBACSYS.LBAC_POLICY ADMIN", line .*
ORA-06512: at line 1
```

```
[START: CLAIMS 1, 2, 5, 21, 22, and 25
For CLAIMS 1 and 21, policy "complex" is applied to jing and policies "complex"
and "simple" are applied to table "abc".
For CLAIMS 2 and 22, a policy column is added when a policy is applied to a
table (e.g. "abc"). (See next bolded section on this page).
For CLAIMS 5 and 25, policy "complex" and "simple" are the two or more policies
of the plurality of label-based policies of table "abc"]
SOL> -- OK now
SOL>
     EXECUTE
LBAC POLICY ADMIN.APPLY TABLE POLICY('complex', 'SCOTT', 'abc', 'NO CONTROL');
PL/SQL procedure successfully completed.
SOL>
     EXECUTE
LBAC POLICY ADMIN.APPLY TABLE POLICY('complex', 'SCOTT', 'jing', 'NO CONTROL');
PL/SOL procedure successfully completed.
SOL>
     EXECUTE
LBAC POLICY ADMIN.APPLY TABLE POLICY('simple', 'SCOTT', 'abc', 'DELETE CONTROL');
PL/SQL procedure successfully completed.
[END: CLAIMS 1, 2, 5, 21, 22, and 25]
SOL> EXECUTE
LBAC POLICY ADMIN.APPLY TABLE POLICY('simple', 'SCOTT', 'EMP', 'DELETE CONTROL');
PL/SOL procedure successfully completed.
SOL> EXECUTE
LBAC POLICY ADMIN.APPLY TABLE POLICY('sile', 'SCOTT', 'jing', 'DELETE CONTROL');
PL/SQL procedure successfully completed.
SOL>
SOL> CONNECT SCOTT/TIGER
Connected.
[Step 103: User 'SCOTT' connects to the database. Note: user 'SCOTT is not
associated with any labels.]
[START: CLAIM 2, 5, 22 and 25
For CLAIMS 2 and 22, policy columns "RGHU" and "RAGHU" are added for policies
"complex" and "simple".
For CLAIMS 5 and 25, these columns are added because policies "complex" and
"simple" are applied - i.e. "the policy set associated with the table includes
two or more policies of the plurality of label-based policies."]
SOL>
SOL>
     DESC abc;
                                           Null? Type
Name
 COLT
                                                    VARCHAR2 (45)
 RGHU
                                                    LBACSYS, LBAC LABEL
                                                    LBACSYS. LBAC LABEL
RAGHU
[END: CLAIM 2, 5, 22 and 25]
```

```
SOL>
SOLS
     INSERT INTO abc(col1)
 2
      VALUES ('fdfd');
1 row created.
[START: CLAIMS 3 and 23
Label "A,B" for policy "simple" is stored in policy column "raghu" corresponding
to the policy.]
SOL>
SOL>
      UPDATE abc
      SET raghu = LBACSYS.TO LBAC LABEL('simple','A,B');
1 row updated.
[END: CLAIMS 3 and 23]
[Step 104/START: CLAIMS 1, 4, 21 and 24
For CLAIMS 1 and 21, the following delete operation is received. It was
previously shown which policies apply to table "abc". Here, only policy "simple"
is enforced on delete because DELETE CONTROL is only specified for policy
"simple" even though both policies "simple" and "complex" are applied. Thus,
policy "simple", of the plurality of label-based policies ("simple" and
"complex"), was determined to be applied to table "abc". In this example, it is
determined that the delete operation is NOT performed based on the set of labels
associated with the row (i.e. user "SCOTT" is not associated with any labels so
the user is denied the ability to delete the row).
For CLAIMS 4 and 24, in order to determine which policies apply, it must be
determined whether a column is a policy column]
SQL> -- Should not allow ...
SOL> DELETE FROM abc:
 DELETE FROM abc
ERROR at line 1:
ORA-12406: unauthorized SQL statement for policy SIMPLE
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC.*
ORA-04088: error during execution of trigger 'LBACSYS.LBAC.*
[END: CLAIMS 1, 4, 21, and 24]
[START: CLAIMS 3 and 23
Shows that label "A,B" associated with policy "simple" is stored in policy
column "raghu" of a row, in table "abc", with value "fdfd"]
SOL>
SOL> SELECT coll, LABEL TO CHAR (raghu)
  2
      FROM abc
  3
     ORDER BY col1:
COLT
LABEL TO CHAR (RAGHU)
fdfd
A,B
1 row selected.
[END: CLAIMS 3 and 23]
```

```
SOL> -- Error Condition
SQL> EXECUTE LBAC SYSDBA.DISABLE POLICY('simple');
BEGIN LBAC SYSDBA.DISABLE POLICY('simple'); END;
ERROR at line 1:
ORA-06550: line 1, column 7:
PLS-00201: identifier 'LBACSYS.LBAC SYSDBA' must be declared
ORA-06550: line 1, column 7:
PL/SOL: Statement ignored
SQL>
SOL> CONNECT LBACSYS/LBACSYS
Connected.
SOL>
      EXECUTE LBAC SYSDBA.DISABLE_POLICY('simple');
SOL>
PL/SQL procedure successfully completed.
SOL>
SOL> -- Error Conditions ...
SQL> EXECUTE LBAC_SYSDBA.DISABLE_POLICY('abcdefghijklmnopqrstuvwxyzfd');
BEGIN LBAC SYSDBA.DISABLE POLICY('abcdefghijklmnopqrstuvwxyzfd'); END;
ERROR at line 1:
ORA-12416: policy abcdefghijklmnopgrstuvwxyzfd not found
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line 1
     EXECUTE LBAC SYSDBA.DISABLE POLICY('abcdefghijklmnopqrstuvwxyz','fdf');
BEGIN LBAC SYSDBA.DISABLE POLICY('abcdefghijklmnopgrstuvwxyz','fdf'); END;
ERROR at line 1:
ORA-06550: line 1, column 7:
PLS-00306: wrong number or types of arguments in call to 'DISABLE POLICY'
ORA-06550: line 1, column 7:
PL/SQL: Statement ignored
SOL>
SQL> -- Should not delete as the disable will be effective from next session
only
SOL>
      DELETE FROM SCOTT.abc;
1 row deleted.
SOL>
SOL> CONNECT SCOTT/TIGER
Connected.
SOL>
SQL>
       SELECT col1, LABEL TO CHAR (raghu)
  2
      FROM abc
       ORDER BY col1;
  3
```

```
no rows selected
SOL>
SOL> -- Should delete now as the policy is disabled ...
SQL> DELETE FROM abc;
0 rows deleted.
SQL>
      SELECT col1, LABEL TO CHAR (raghu)
 2
      FROM abc
 3
      ORDER BY col1;
no rows selected
SOL>
SQL> INSERT INTO abc (col1)
     VALUES('123233');
1 row created.
SOL>
SQL> -- Error Condition ...
SOL> EXECUTE LBAC SYSDBA.ENABLE POLICY('simple');
BEGIN LBAC_SYSDBA.ENABLE_POLICY('simple'); END;
ERROR at line 1:
ORA-06550: line 1. column 7:
PLS-00201: identifier 'LBACSYS.LBAC SYSDBA' must be declared
ORA-06550: line 1, column 7:
PL/SQL: Statement ignored
SOL>
SQL> CONNECT LBACSYS/LBACSYS
Connected.
SOL>
     EXECUTE LBAC SYSDBA.ENABLE POLICY('simple');
SOL>
PL/SQL procedure successfully completed.
SOL>
SOL> -- Error Conditions ...
SQL> EXECUTE LBAC SYSDBA.ENABLE POLICY('simpler1');
BEGIN LBAC SYSDBA.ENABLE POLICY('simpler1'); END;
ERROR at line 1:
ORA-12416: policy simpler1 not found
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line 1
     EXECUTE LBAC SYSDBA.ENABLE POLICY('simple', FALSE);
BEGIN LBAC SYSDBA. ENABLE POLICY ('simple', FALSE); END;
```

```
ERROR at line 1:
ORA-06550: line 1, column 7:
PLS-00306: wrong number or types of arguments in call to 'ENABLE_POLICY'
ORA-06550: line 1, column 7:
PL/SOL: Statement ignored
SOL>
SOL> -- Should delete now as the enable will be effective only from new session
SOL> DELETE FROM SCOTT.abc;
1 row deleted.
SOL>
SOL> CONNECT SCOTT/TIGER
Connected.
SOL>
SOL> -- Expecting no rows ...
SQL> SELECT col1, LABEL_TO_CHAR(raghu)
     FROM abc
     ORDER BY col1:
 3
no rows selected
SOL>
SOL>
     INSERT INTO abc(col1)
     VALUES ('1232');
 2
1 row created.
SQL> -- Delete should fail ...
SOL> DELETE FROM abc;
 DELETE FROM abc
ERROR at line 1:
ORA-12406: unauthorized SQL statement for policy SIMPLE
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC.*
ORA-04088: error during execution of trigger 'LBACSYS.LBAC.*
SQL>
     SELECT col1, LABEL TO_CHAR (raghu)
SOL>
  2
      FROM abc
      ORDER BY col1:
  3
COL1
LABEL_TO_CHAR (RAGHU)
1232
```

1 row selected.

```
SQL> CONNECT LBACSYS/LBACSYS
Connected.
SQL>
SOL>
       EXECUTE LBAC SYSDBA.DROP POLICY('simple', TRUE);
PL/SQL procedure successfully completed.
     EXECUTE LBAC SYSDBA.DROP POLICY('complex', FALSE);
SOL>
PL/SOL procedure successfully completed.
SOL>
     EXECUTE LBAC SYSDBA.DROP POLICY('sile');
PL/SQL procedure successfully completed.
SQL> EXECUTE LBAC SYSDBA.DROP POLICY('abcdefghijklmnopqrstuvwxyz1234');
PL/SQL procedure successfully completed.
     EXECUTE LBAC SYSDBA.DROP POLICY ('abcdefghijklmnopgrstuvwxyz');
BEGIN LBAC SYSDBA.DROP POLICY('abcdefghijklmnopgrstuvwxyz'); END;
ERROR at line 1:
ORA-12416: policy abcdefqhiiklmnopgrstuvwxyz not found
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC SYSDBA", line .*
ORA-06512: at line 1
SOL>
       EXECUTE LBAC SYSDBA.DROP_POLICY('india');
PL/SQL procedure successfully completed.
SOL>
SOL> -- Error Conditions
SQL> EXECUTE LBAC SYSDBA.DROP POLICY('adfd');
BEGIN LEAC SYSDBA.DROP POLICY('adfd'); END;
ERROR at line 1:
ORA-12416: policy adfd not found
ORA-06512: at "LBACSYS.LBAC STANDARD", line 0
ORA-06512: at "LBACSYS.LBAC_SYSDBA", line .*
ORA-06512: at line 1
SOL> EXECUTE LBAC SYSDBA.DROP POLICY('simple', XYZ);
BEGIN LBAC_SYSDBA.DROP_POLICY('simple', XYZ); END;
ERROR at line 1:
ORA-06550: line 1, column 40:
PLS-00201: identifier 'XYZ' must be declared
ORA-06550: line 1, column 7:
PL/SQL: Statement ignored
```

```
SQL> SELECT *
```

FROM DBA LBAC POLICIES

ORDER BY POLICY NAME:

no rows selected

SOL>

SOL> CONNECT SCOTT/TIGER

Connected.

SOL>

SQL> -- Simple policy was applied on two tables (abc, emp) the hidden column

SOL> -- be dropped as the TRUE option is set; Policy complex was applied to

SQL> -- two tables (abc, jing) and hidden column should not be dropped as the SQL> -- was set to FALSE; Policy sile was applied to a table (jing) and the

hidden

SOL> -- column should not be dropped as the default option is FALSE.

SQL> DESC abc; SQL>

Name Null? Type

______ COL1 VARCHAR2 (45) LBACSYS.LBAC LABEL RGHU

SQL> DESC jing;

Null? Type

...... COL1 VARCHAR2 (45) LBACSYS.LBAC LABEL

RGHU TESTLABEL

SOL> DESC EMP:

Null? Type Name ______ NOT NULL NUMBER (4)

LBACSYS.LBAC LABEL

VARCHAR2 (10) VARCHAR2 (9)

NUMBER (2)

EMPNO ENAME JOB

MGR NUMBER (4) HIREDATE DATE NUMBER (7,2) SAL NUMBER (7,2) COMM

DEPTNO SOL>

SOL> DROP TABLE abc:

Table dropped.

SOL> DROP TABLE jing;

Table dropped.

SOL>

SQL> SET ECHO OFF